This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-6 (Withdrawn)

7. (Currently amended) A method for identifying molecular structures within a sample substance, comprising the steps of:

(a) applying the substance to a plurality of test sites formed on a surface of ~~said~~ an integrated circuit array sensor, wherein the integrated array sensor includes a set of active pixels, with each pixel having one or more transistors within the pixel and multiple column readout circuits and is operable to detect and output an electrical signal representative of the electric charge accumulated by associated pixel circuitry upon formation or dissociation of molecular complexes formed on said test sites of the array sensor,

and wherein said test sites having respective probes attached thereto which specifically bind to a target molecular structure, such that different test sites have probes which specifically bind to different target molecular structures;

(b) controlling the ~~maintaining a constant preprogrammed~~ temperature of the substance and said integrated circuit array sensor~~, or alternatively, running a preprogrammed temperature profile such as, but not limited to, gradually increasing or decreasing the temperature or, stepwise changing of the temperature of the sample substance and said integrated array sensor~~;

(c) acquiring an electronic signal from a plurality of the pixels associated with the test sites, each test site covering at least one pixel of said integrated array sensor; and

(d) detecting the amplitude of the electronic signals versus time from the test sites to determine which probes have interacted with an associated target molecular structure such that a plurality of different targets can be detected.

8. (Currently amended) The method of claim 7 wherein said probes are oligonucleotide probes ~~or their analogous equivalent known to one skilled in the art~~.

Claims 9-11 (Withdrawn)

12. (Original) The method of claim 7 wherein said detection step comprises detecting an electronic signal at a constant temperature of the sample substance and said integrated array sensor.

13. (Original) The method of claim 7 wherein said detection step comprises detecting an electronic signal during a stepwise change of the temperature of the sample substance and said integrated array sensor.

14. (Currently amended) The method of claim 7 wherein said detection step comprises detecting an electronic signal during a ~~gradual~~ change of the temperature of the sample substance and said integrated array sensor.

15. (Original) The method of claim 7 wherein said detection step comprises detecting an electronic signal versus time for each probe site, therefore providing identification of the sample substance based upon the rate of a rising or falling electronic signal versus time due to forming or, equally acceptable, breaking of probe-target duplexes of the probe and target molecular structures.

16. (Original) The method of claim 14 wherein said detection step comprises detecting an electronic signal for each probe site versus the temperature, therefore providing said identification of the molecular structures of the sample substance based on the specific temperature of binding, or equally acceptable, based on the specific temperature of melting of probe-target duplexes.

17. (New) The method of claim 7, wherein the step of controlling the temperature of the substance and said integrated circuit sensor comprises maintaining a constant preprogrammed temperature of the substance and said integrated circuit array sensor.

18. (New) The method of claim 7, wherein the step of controlling the temperature of the substance and said integrated circuit sensor comprises increasing or decreasing the temperature of the substance and sensor as a function of time.

19. (New) The method of claim 7, wherein the step of controlling the temperature of the substance and said integrated circuit sensor comprises stepwise changing of the temperature of the sample substance and said integrated array sensor.

20. (New) A method for identifying molecular structures within a sample substance, comprising the steps of:

(a) applying the substance to a plurality of test sites formed on a surface of an integrated circuit array sensor, the integrated array sensor operable to detect electrical signals produced on the test sites in the absence of any external application of external electrical signals to the test sites, the test sites having respective probes attached thereto which specifically bind to a target molecular structure, such that different test sites have probes which specifically bind to different target molecular structures;

(b) controlling the temperature of the substance and said integrated circuit array sensor;

(c) acquiring an electronic signal from a plurality of the pixels associated with the test sites, each test site covering at least one pixel of said integrated array sensor; and

(d) detecting, in the absence of any external application of external electrical signals to the test sites, the amplitude of the electronic signals versus time from the test sites to determine which probes have interacted with an associated target molecular structure such that a plurality of different targets can be detected.